

PROCEEDINGS
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ANDROPOGON HALEPENSIS AND ANDROPOGON
SORGHUM.

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Johnson-grass, *Andropogon halepensis* (L.) Brot., and sorghum, *A. sorghum* (L.) Brot., are nearly always treated as distinct species in botanical works. Along with this botanical treatment, however, the statement is frequently made that the latter is believed to be derived from the former under cultivation. This conclusion is usually accredited to Hackel but without due consideration to what that botanist actually wrote. It is true Hackel considered that there was but one botanical species involved, namely, *Andropogon sorghum*, but consisting of two subspecies, *A. sorghum halepensis*, wild perennial or rarely annual plants with the spikelets readily deciduous at maturity, and *A. sorghum sativus* mostly cultivated, annual or in the tropics sometimes perennial plants, with the spikelets persistent at maturity. While Hackel regarded the cultivated plants as having been derived by cultivation from *A. sorghum halepensis*, he expressly writes that he does not believe that the wild varieties with rootstocks were at all concerned with the cultivated sorghums, but that the latter originated from such wild varieties as *effusus*, *virgatus* and *aethiopicus*, all of which are devoid of rootstocks.

A more satisfactory treatment of the plants in question is to consider them two distinct species—*Andropogon halepensis*, perennial plants possessing rootstocks, and *Andropogon sorghum*, annual plants (perennating in frostless regions) without rootstocks. The facts of distribution as well as those concerned

with the origin of the cultivated sorghums are consistent with this treatment.

In reaching the conclusions in the classification here presented the writer has had the advantage of studying many of the forms under cultivation, besides all the herbarium material in this country, and that at Kew and at Berlin. The location of each specimen studied is indicated by giving in parentheses the name of the herbarium to which it belongs.

KEY TO THE SUBSPECIES OF *Andropogon halepensis*.

Stems relatively slender, rarely over 7 mm. in diameter; leaf blade less than 30 mm. broad; rootstocks abundant.

Panicle not loose and drooping.

Awns present *A. halepensis*.

Awns wanting *A. halepensis anatherus*.

Panicle loose and drooping.

Awns present *A. halepensis miliformis*.

Awns wanting *A. halepensis muticus*.

Stems stout, 10-30 mm. in diameter; leaf blades 3-5 cm. broad; rootstocks few.

Spikelets 4 mm. long *A. halepensis propinquus*.

Spikelets 4.5-5 mm. long *A. halepensis siamensis*.

***Andropogon halepensis* (L.) Brot.**

Holcus halepensis L. Sp. Pl. 1047. 1753. Based on the description and figure of Plukenet (Alm. 176. t. 32 f. 1. 1696). Plukenet's specimen was from Bobart, but its source is not indicated except by the descriptive term *halepense*, from which it may be surmised that Aleppo or Haleb, Asia Minor, is its original source. Plukenet's crude figure shows an awned grass, which in the absence of any evidence to the contrary may well be Johnson-grass.

Andropogon arundinaceus Scop. Fl. Carn. Ed. 2, 2:274. 1772. Specimen from a field in "Tergestino," Carniola. Scopoli, however, cites older polynomial synonyms of Linnaeus and of Scheuchzer.

Andropogon halepensis Brot. Fl. Lusit. 1:89. 1804.

Sorghum halepense Pers. Syn. 1:101. 1805.

Sorghum dubium Koch, Linnaea 21:443. 1848. Original specimens from Caucasia, found growing with *A. halepensis*. The plants were diseased, being infested with a smut, which probably accounts for the differences noted by Koch.

Andropogon dubitatus Steud. Syn. Pl. Glum. 1:394. 1854. A change of name for the preceding on account of the earlier *Andropogon dubius* Kunth.

Sorghum halepense latifolium Willk. & Lange Prodr. Fl. Hisp. 1:48. 1861.

Andropogon sorghum halepensis genuinus Hack. in DC. Monogr. Phan. 6:502. 1889.

Perennial, with extensively creeping white rootstocks 30 to 90 cm. long which penetrate to a depth of 30 to 90 cm., the scaly sheaths about equalling the internodes; culms green except the purple nodes, erect, terete, glabrous or slightly waxy below the nodes, 1-2 meters tall, mostly simple, pubescent only at the more or less constricted nodes; internodes 7-9; sheaths smooth or the collar pubescent, those of the culm terete, mostly shorter than the internodes, those of the innovations compressed; blades linear, 30-60 cm. long, 10-20 mm. wide, attenuate-acuminate, flat, the white midvein conspicuous, the margins scabrous; ligule rounded, 1-3 mm. long, ciliolate, pubescent on the back, membranaceous; panicle 10-40 cm. long, well exserted, erect or suberect, oblong to subpyramidal, rather open, the rachis glabrous except on the scabrous angles; rays mostly in whorls of 2-8 in 5-10 sets, ascending, the longer ones half as long as the panicle, mostly naked for the lower $\frac{1}{3}$ - $\frac{1}{2}$, scabrous on the margins, pubescent at the enlarged base; spikelets usually in threes, often but two, rarely solitary; central spikelet sessile, perfect, the lower glume convex, with strongly inflexed sides, broadly lanceolate, 4.5 mm. long, 1.5-2.2 mm. broad, faintly 5-nerved, chartaceous except the margins near the apex, acute or often obscurely 3-toothed at apex, usually purple tinged, thinly pubescent especially along the margins and toward the base, the back becoming glabrous and shining, the nerves obscure; upper glume narrower, chartaceous, inflexed at the sides, somewhat keeled, acute, pubescent near the apex, base and margins, partly enclosed by the lower which it equals in length; sterile lemma one-fourth shorter, hyaline, deltoid-ovate with inflexed sides, truncate, ciliate on the margins, 2-nerved: fertile lemma one-half as long as the lower glume, obovate, deeply 2-lobed with diverging lobes, strongly ciliate, bearing from the back near the base a stout geniculate awn 10-15 mm. long; palea a little shorter than the lemma, oblong, obtuse, ciliate, nerveless; anthers yellow, 2.5-3 mm. long; stigmas linear, densely plumose, on styles of equal length; caryopsis brownish-yellow, oblong-obovate, 2.5-3 mm. long, convex on the back, the scutellum broadly oval more than one-half as long as the grain; lateral spikelets staminate, rarely neutral, much narrower than the perfect spikelet but of about the same length, borne on very hairy pedicels about half as long as the sessile spikelet; glumes membranaceous, strongly nerved.

Abundant in the United States, especially south of latitude 37°. Farther northward it commonly winterkills. First introduced from Turkey in 1830.

In the Old World it is native of most of the countries surrounding the Mediterranean and eastward to the Himalayas. Herbarium material has been examined from Spain, France, Switzerland, Italy, Hungary, Cilicia, Cyprus, Crete, Greece, Madeira, Canary Islands, Morocco, Algeria, Tunis, Syria, Persia, Afghanistan and the Himalayas. In India it is mostly replaced by *A. halepensis miliformis*.

The specimens from Madeira and Morocco have very dark purple spikelets.

Andropogon halepensis anatherus n. subsp.

Fertile lemma hyaline, oval, obtuse, 1-nerved, awnless; otherwise similar to *A. halepensis*.

Abundantly introduced in the United States, apparently as common as the plant with awns. In the Old World its range seems practically continuous with that of *A. halepensis*.

Type specimen in U. S. National Herbarium collected at Marco, Florida, August, 1900, A. S. Hitchcock No. 1900.

Hackel evidently confused under the name *A. halepensis muticus* two different plants, but his citation of specimens indicates that he had in mind particularly the one which occurs in India, namely, the awnless form of *A. halepensis miliformis*.

Andropogon halepensis leiostachyus Hack. in DC. Monogr. Phan. 6:502. 1889.

Sessile spikelet awned, glabrous.

Known only by specimens from Corsica.

Andropogon halepensis miliformis (Schultes) n. comb.

Andropogon miliaceus Roxb. Flora Indica 1:276. 1820. Described from specimens grown at Calcutta from seed collected in the "mountains north of Oude," India.

Andropogon miliformis Schultes Mantissa 2:448. 1824. Change of name of the above on account of the older *A. miliaceus* Forsk.

"*Andropogon laxus* Linn. Sp. Pl. ed. Willd." 4:907. 1805. Under the above name Roxburgh, Flora Indica 1:275. 1820, describes a plant which is probably not different from his *A. miliaceus*. The plant is certainly not *A. laxus* Willd. as above cited. It has usually been called *A. laxus* Roxb.

Andropogon controversus Steud. Syn. Pl. Glum. 1:391. 1854. A change of name for the grass described as *Andropogon laxus* Linn. by Roxburgh on account of the older *Andropogon laxus* Willd.

Rootstocks very abundant, short and thick, making a dense mat; stems tall, slender, 2-3 meters high, with usually 11 nodes; leaf blades 5-15 mm. wide; panicle very large and loose, 15-60 cm. long, half as broad, the very slender branches and the tip somewhat drooping; lower and upper glumes coriaceous, becoming dark at maturity; awn 12 mm. long; caryopsis yellow-brown, ellipsoid, compressed, 2-2.5 mm. long.

Young and starved specimens are not easily distinguished from true *halepensis* but well grown panicles are always very loose and drooping. Hackel speaks of some of these Indian forms as intermediate between *halepensis* and *effusus*, but this statement refers to the panicle and is without due consideration of the rootstock character.

Stapf (Hooker, Flora Brit. India 3:182. 1897) considers that there are two forms in India, one with the sessile spikelets $\frac{1}{2}$ to $\frac{1}{3}$ inch long

(*A. miliaceus* Roxb.) the other with the sessile spikelets $\frac{1}{5}$ to $\frac{1}{4}$ inch long (*A. laxus* Roxb.)

The following specimens are all in the herbarium at Kew: Chenab River, Punjab, *Thompson*, Nov. 1846; India, *Herb. Wight*, No. 1673; Punjab, *Thompson*; Mehannddee, below Muldah, *Hooker and Thompson*, 11 | 5 | 50; Afghanistan, Bolan Pass, *Griffith*; Khoondas, Nilgiri Hills, *Hohenacker*, No. 1284; Howrah, *J. D. Naske*, No. 1317; Monghyr, *Mekim*, No. 1402; Assam, *Fielding*; Kashmir, *V. Jacquemont*, No. 6561; H. I. No. 8778.

Under cultivation at Arlington, Farm, Va., this grows to a much greater size than *A. halepensis* (*genuinus*) and differs conspicuously in its larger looser panicles. The rootstocks are extraordinarily abundant, short and thick, forming a dense tangled mass.

The cultures of this subspecies were from seed collected by A. C. Hartless at Saharanpur, India.

Andropogon halepensis muticus Hack. in DC. Monogr. Phan. 6:502. 1889.

Awns wanting, otherwise as in *A. halepensis miliformis*.

Hackel included under the name *A. halepensis muticus* both the plant here considered and *A. halepensis anatherus*. His references are however primarily to the awnless plant of India.

The following specimens are in the herbarium at Kew: Ceylon, *Thuwaites* No. 2484; ——— *Herb. Griffiths* No. 6825; Chumba 3000 ft. alt. *C. B. Clarke*; Rawul Pindee, *J. E. T. Aitchison* No. 116, Aug. 1870; Kumaon, *Strachey & Winterbottom* No. 2; Nahan, *V. Jacquemont* No. 2518; Mustafabad, Punjab, *Thomson*; Bhyrowal, 45 mi. east of Lahore, *Thomson?* No. 1542; Timmoo Ghat, *Thomson*, Oct. 1846.

This plant was apparently confused by Hackel with *propinquus* also, as under the latter name he cites a specimen from Ceylon collected by Trimen. Specimens grown in the Botanic Garden at Durban, Natal, *J. Medley Wood*, Nos. 6000 and 6675 (Kew) clearly belong here; one collected in Abyssinia by *Figari* is apparently the same.

Andropogon halepensis propinquus (Kunth) Hack.

Andropogon affinis J. S. Presl in C. B. Presl Rel. Haenk. 1:343. 1830. Specimen from Luzon.

Andropogon propinquus Kunth Enum. 1:502. 1833. Change of name due to the older *A. affinis* R. Br.

Andropogon halepensis propinquus Hack. in DC. Monogr. Phan. 6:503. 1889.

Perennial, but producing only a few stout rootstocks, 15 to 30 cm. long, sometimes 1 cm. in diameter; culms several to many, stout, 2-3 or under cultivation 5 meters high, and 0.5-3 cm. in diameter; nodes 15-26; leaf blades 3-5 cm. broad, 30-100 cm. long, sparsely appressed-pubescent at the collar, and loosely pubescent on the swellings at the base above; ligule very ciliate; panicle large, densely flowered, 20-60 cm. long, the

slender branches ascending; rays and their lower branches very pubescent at the thickened bases; spikelets dark purple or less commonly pale, unawned, readily deciduous, the sterile on pedicels more than half the length of the fertile; lower glume membranaceous, elliptic, 4 mm. long, 1.8 mm. wide, 7-nerved, green or straw-colored when mature; upper glume coriaceous, chestnut-colored and shiny when mature; anthers 2 mm. long; caryopsis yellow, obovoid, 1.5 mm. long.

This subspecies is very different from those above discussed in its much coarser stems and broader leaves, in which respect it more closely resembles the cultivated sorghums. The innovations are all extravaginal and mostly short, but stout elongated rootstocks are occasionally formed. The blossoms appear much later than in *A. halepensis (genuinus)*; indeed it does not reach bloom at Washington, D. C., at the time it is killed by frost, but the rootstocks survive the winter. At Biloxi, Miss., plants two years old do not bloom until the end of October.

Originally collected by Haenke in Luzon. Abundant near Manila, whence the seed was received to cultivate the plant. Specimens examined: Davao, Mindanao, *Copeland* No. 466; Arayat, Luzon, *Merrill* No. 1468; P. I., *Loher* No. 7169, 7209; Luzon, *Cuming* No. 569; Balabac, *Vidal* No. 3996; Los Banos, Luzon, *Elmer* No. 8287; Novaliches, Luzon, *Loher* No. 1806; Montalban, Luzon, *Loher* No. 1807; Buru, *Reidel*; Borneo, Bangamassing, *J. Motley* No. 444; Borneo, Sarawak, *Beccari* No. 3924. The specimens from Borneo drop their spikelets very readily. Hainan, *Henry* No. 8295; North River near Canton, *Hance* No. 4879; Tai Fu, *C. Ford* No. 484. These three Chinese specimens are somewhat ambiguous toward *siamensis*.

***Andropogon halepensis siamensis* n. subsp.**

Closely allied to *propinquus*, differing only in the larger spikelets 4.5 to 5 mm. long.

Cambodia, Pnum Penh, *Godefroy-Lebeuf* No. 83, Oct. 1878 (Kew); Siam, Pak Bawag, *Kerr* No. 2006, Sep. 4, 1911 (Kew); Siam, near Kam-pang, *Kerr* No. 2156, Oct. 11, 1911 (Kew) (type) "12-15 ft. high; growing in pampas along banks of Mei Ping river."

From *propinquus* this is easily separated by its much larger spikelets and from *muticus* by the larger size, broader leaves and larger more densely floriferous panicle.

***Andropogon sorghum* (L.) Brot.**

Holcus sorghum L. Sp. Pl. 1047. 1753. Based on descriptions of cultivated sorghums by Bauhin and other writers. From the various synonyms cited by Linnaeus, his conception of the species in 1753 included only varieties with the lemmas awned, but with the glumes glabrous or villous and the grains yellow or white. By tracing the synonyms given by Linnaeus it is seen that his species included not only the sorghum with yellow seed and smooth glumes then as now cultivated in southern Europe and supposed to be from India, but also one, perhaps two,

Arabian varieties with flat white seeds and villous glumes, one of which is surely the same as or very similar to white durra.

Andropogon sorghum Brot. Fl. Lnsit. 1:88. 1804. Based on *Holcus sorghum* L.

Andropogon sorghum is best differentiated from *A. halepensis* by the absence of rootstocks. All other characters that have been used break down completely. Thus the persistence of the spikelets in *Andropogon sorghum* as contrasted with their ready disjunction in *Andropogon halepensis* does not hold in several of the wild races (*virgatus*, *eichingeri*, *verticilliflorus*) and in some cultivated varieties the spikelets also shatter readily.

Andropogon sorghum is a much more diverse species than is *A. halepensis*. The species so far as the wild forms are concerned is apparently limited to the African continent south of the Sahara Desert, except in Egypt where it occurs to the mouth of the Nile, and Madagascar and the neighboring islands. In Tahiti occurs a race known as Toura grass not identified with any of the African sub-species, but it is doubtful if Toura grass is native in Tahiti. Still more doubtful is the scanty material from Australia. Some of the Australian specimens are undoubtedly introduced *A. halepensis*, but others scantily represented are not identified with any known form of either *A. sorghum* or *A. halepensis*. It is therefore possible that races of *Andropogon sorghum* are native to Australia and even to Tahiti.

Eleven wild races or subspecies are here described. The more marked of these such as *exiguus*, *hewisoni* and *vogelianus* are very distinct, but others such as *sudanensis*, *verticilliflorus* and *effusus* seem connected by intermediate forms. It is entirely probable when ample material is available from the vast continent of Africa, that many more often illy defined races will be found to occur. It is perfectly clear that the species as a whole is a remarkable assemblage of races and that much further investigation is necessary to determine definitely which of these races were brought into cultivation by the negroes thus giving rise to the long series of cultivated varieties.

KEY TO THE WILD SUBSPECIES OF *Andropogon sorghum*.

Culms slender, rarely exceeding 6 mm. in diameter; sheaths mostly shorter than the internodes; panicles loose.

Panicle long and narrow, the rays strongly ascending or nearly erect.

Lower glume of fertile spikelet narrowly lanceolate, 9-11 nerved, nearly glabrous on the back *exiguus*.

Lower glume of fertile spikelet ovate-lanceolate, 7-9 nerved, very hairy *eichingeri*.

Panicle broad, the rays spreading.

Leaf-blades narrow, rarely as much as 15 mm. broad; panicle branches ascending-spreading; lower glume 6-7 mm. long, nearly glabrous on the back *sudanensis*.

Leaf-blades broader, often 2-3 cm. wide.

- Panicle branches ascending; lower glume lanceolate, 8-9 mm. long *vogelianus*.
- Panicle branches usually nodding; lower glume smaller, 5-7 mm. long.
 Lower glume elliptic-lanceolate, 6-7 mm. long; awns short or wanting *effusus*.
- Lower glume lanceolate to ovate-lanceolate, 5-6 mm. long; awns 12 mm. long *verticilliflorus*.
- Culms stout, usually 1 cm. or more in diameter; sheaths mostly longer than the internodes; panicles rather dense.
 Spikelets falling readily, the glumes very hairy on the back at least when young.
 Lower glume elliptic-lanceolate, 6-7 mm. long; awns 20-25 mm. long; panicle spreading at top *abyssinicus*.
- Lower glume broadly ovate.
 Panicle oblong, not very dense; lower glume 6.5-8 mm. long
cordofanus.
- Panicle fusiform, very dense; lower glume 5.5 mm. long
hewisoni.
- Spikelets persistent, the glumes not very hairy on the back even when young.
 Lower glume ovate, very convex, 4-5 mm. long, 7-nerved . *niloticus*.
 Lower glume elliptic-lanceolate, not very convex, 5-6 mm. long, 11-nerved *drummondii*.

***Andropogon sorghum exiguus* (Forsk.) n. comb.**

Holcus exiguus Forsk. Fl. Aeg.-Arab. 174. 1775. Specimens collected along the banks of the lower Nile. There can scarcely be doubt that this is the same as the succeeding.

Andropogon sorghum virgatus Hackel in DC. Monogr. Phan. 6:504. 1889. The first of numerous specimens cited is Damietta, *Ehrenberg*.

Culms slender, 3-6 or rarely as much as 10 mm. in diameter, erect, usually several from the same root; internodes 5, appressed-pubescent; leaf-blades narrow, 8-12, rarely 20 mm. broad, 20 to 40 cm. long, green or somewhat purplish tinged, more or less folded, glabrous to the base; panicle narrow, erect or a little nodding at apex, 25-50 or rarely 60 cm. long, with slender erect or ascending branches, the lower 6 to 10, rarely 15 cm. long, naked near the base, less than half the length of the panicle; lower glume of the fertile spikelet slightly indurated, 7 mm. long, 2 mm. broad, narrowly lanceolate, not constricted at base, pale-green, but becoming straw-colored when fully mature, pubescent with white hairs except on the back, 9-11 nerved, the veins evident above the middle; awns 12 to 16 mm. long, geniculate; sterile spikelets 6-8 mm. long, narrowly lanceolate, but little exceeding the very hairy pedicels; caryopsis elliptic, flattened, orange-colored, 4 mm. long.

Kordofan, *Kotschy* No. 173. (Kew); Near Khartum, *Kotschy* No. 316, March 1, 1839 (Berlin), a dwarfed form with smaller spikelets; Egedeh

(=El Egeda) between Khartum and Berber, *Schweinfurth* No. 529, Oct. 20, 1868 (Kew. Berlin); Tedac (?) between Khartum and Berber, *Schweinfurth* No. 538, Oct. 19, 1868 (Berlin); Matamma, Gallabat, N. Abyssinia, *Schweinfurth* No. 1428, Oct. 19, 1865 (Berlin); between Old Dongola and Merawat, *Dr. Bromfield* No. 32, Feb. 11, 1851 (Kew) "Arab-gerou."; Cairo, *Thos. Brown* in 1914 (Washington); Cairo, cultivated, *B. G. C. Bolland* July 15, 1912 (Kew).

Exiguus is a very distinct and apparently very uniform subspecies. All of the specimens examined are from Egypt, mostly from the region about Khartum, though Haekel cites a specimen from Senegal. This subspecies has been grown for several years under the name Tunis grass, from seed obtained through Dr. L. Trabut of Algeria, who writes that he secured it originally from Egypt. Under cultivation *exiguus* crosses naturally with *sudanensis* and with such cultivated varieties as Amber. The readiness with which *virgatus* sheds its spikelets does not recommend it for cultivation and there is no reason to believe that any of the culture forms of sorghum are derived from it.

***Andropogon sorghum eichengeri* n. subsp.**

Culms slender, not over 3 mm. thick, about 1 meter tall; leaf-blades bright green, 1-2 cm. broad, 10-20 cm. long; nodes glabrous; panicle erect, very narrow, scarcely exerted, 15-20 cm. long; branches erect, the longest about half the length of the panicle; fertile spikelets promptly deciduous; lower glumes ovate-lanceolate, acuminate, 7 mm. long, 7-9-nerved, densely covered with appressed silvery hairs; awns 25-27 mm. long; sterile spikelets narrow, glabrous, on very hairy pedicels.

A very distinct subspecies, collected by *Eichenger*, No. 3365 (type) at Buiho, German East Africa, in wet places, June, 1911 (Berlin).

***Andropogon sorghum sudanensis* n. subsp.**

Culms relatively slender, 2 to 3 meters tall, rarely more than 6 mm. thick, usually many from the same root; nodes 9, appressed-pubescent; leaf-blades narrow, bright green, 15 to 30 cm. long, 8 to 12 mm. broad, flat or nearly so; panicle erect, ovate-pyramidal 15 to 30 cm. long, about half as broad; panicle branches slender, flexuous, ascending-spreading, subverticillate in 5 to 8 whorls, the longest about half as long as the panicle, naked for the lower half or third, nearly glabrous at the nodes; lower glume of fertile spikelet elliptic-lanceolate, faintly 11-nerved, coriaceous, slightly shiny, glabrous except for a few hairs at the base and toward the margin, straw-colored or rarely black when mature, 6 to 7 mm. long, 2 to 2.5 mm. broad, slightly constricted above the callus; awns 15 mm. long; sterile spikelets strongly nerved, very narrow, persistent, on hairy pedicels nearly as long; caryopsis oval, flattened, orange, 4 mm. long.

Type specimen grown at Arlington Farm, Virginia, from seed secured from R. Hewison, Esq., Khartum, Anglo-Egyptian Sudan. Mr. Hewison writes that the grass is cultivated under the name *garawi*. This same

name or its variant *gerau* is used in lower Egypt for *A. sorghum virgatus*. Mr. Hewison writes that he does not know this form as growing wild.

In the United States this subspecies has been found very valuable as a hay grass, and it is now extensively cultivated in the semi-arid regions under the name Sudan-grass.

Specimens definitely referable to *sudanensis* are the following: Aegyptia superior, *Seeber* (Kew); Cairo, collector unknown (Kew); Senegambia, 1837 (Kew); Kondowe-Karonga, Nyasaland, 2000-6000 ft. alt., *A. Whyte* (Kew).

A very closely similar plant is represented by the following specimen: Katagum District, Northern Nigeria, *Dr. J. M. Dalziel* No. 293, "Tall by rivers." "Dawar rafi" (Kew). This specimen differs from Sudan-grass in having the herbage paler and somewhat glaucous, the leaves broader, 15-25 mm. broad, and the fertile spikelets elliptic-lanceolate 7-8 mm. long, becoming reddish at maturity and with a transverse depression near the base. In some respects it is intermediate toward *Andropogon sorghum drummondii*.

***Andropogon sorghum vogelianus* n. subsp.**

Stout, the culm at base of panicle 5 mm. thick; upper leaf-blade flat, 5 cm. broad, 45 cm. long, green; panicle pyramidal, very large, 50 cm. long, 30 cm. broad, erect, loose; branches subverticillate in about 10 whorls, ascending, mostly naked below the middle, the lowest one-third as long as the panicle, the nodes pilose; lower glume of fertile spikelet sessile, lanceolate, acuminate, 8-9 mm. long, 2.5-3 mm. broad, firmly indurated, faintly 7-nerved, straw-colored, persisting, smooth on the back, pilose at base and near the margins with ferruginous hairs; awns 15-17 mm. long; sterile spikelets lanceolate, strongly nerved, nearly smooth, 8-10 mm. long on shorter pilose pedicels; mature caryopsis not seen.

Type collected on the banks of the Nun mouth of the Niger River, *Vogel* No. 11 (Kew). The color of the hairs on the spikelets may be due to age or other causes. A remarkable plant allied to *effusus* but with stouter panicle and larger longer-haired spikelets. No other specimen seen matches the Vogel plant but the following are very similar.

Cameroon River, *G. Mann* No. 2109, January, 1863 (Kew). Leaves 2 cm. broad, pubescence of the spikelets scanty, white.

Idu, Engermi River, *J. H. Holland* No. 153, Sept. 23, 1898 (Kew). Perhaps Idume on Ngunie River. A small slender plant with leaves 1 cm. or less broad, panicle 8-10 cm. long, and spikelets awnless, otherwise like those of the Vogel plant.

Korbo, Chari River, near Lake Chad, *Chevalier* No. 9397, July 30, 1903 (Berlin). This agrees with the Vogel plant, except that the spikelets are 10 mm. long and the pubescence is white.

Waly Fluss, German East Africa, *R. Bohm* No. 101, March 2, 1882 (Berlin). Panicle 45 cm. long, 30 cm. broad, loose and open with stout spreading branches. Awns 14 mm. long. Spikelets 7-10 mm. Agrees well with the Chevalier plant.

Entebbe, Uganda, alt. 4000 ft., Mahon (?) in 1902 (Kew). Panicle loose and open; spikelets 7–8 mm. mostly fallen; awns 17 mm. Tip of pedicels glabrous. Probably distinct from *vogelianus*.

Below Mazzaro, Zambesi River, Dr. J. Kirk, March 31, 1860 (Kew). "Grows in damp places 4–8 feet high. Fruit eaten by the people in times of famine." Spikelets 7 mm. long; awns 12–17 mm. long. Panicle pyramidal and open. Agrees well with the Entebbe specimen.

Kibwezi, German East Africa, G. R. O. Schaffler No. 498, June 5, 1910, 1000 ft. alt. (Berlin). Spikelets 6–8 mm. long. Awns 20–22 mm. long.

***Andropogon sorghum effusus* Hackel.**

Andropogon arundinaceus Willd.: L. Sp. Pl. Ed. 4. 4:906. 1805. Not Scopoli, 1772. Based on a plant collected by Isert in Guinea.

Rhaphis arundinacea Desv. Opuscula 69. 1831. Different generic reference for *Andropogon arundinaceus* Willd.

Andropogon sorghum effusus Hackel in DC. Monogr. Phan. 6:503. 1889.

In Hackel's conception, *Andropogon sorghum effusus* is based on the combined characters of two subvarieties, namely, subvariety *aristatus* with the awn 7–9 mm. long for which are cited the following synonyms: *Andropogon arundinaceus* Willd.; *Rhaphis arundinacea* Desv.; *Trachypogon avenaceus* Nees; and *Sorghum halepense* Nees Fl. Afr. Austr. p. 88; and subvariety *submuticus* with the awn barely protruding, to which is referred *Holcus decolorans* Willd. (*Andropogon decolorans* H B K.). Hackel's citations of specimens bear no relation to the types of the above names, the first specimen cited being Schweinfurth's No. 1521 from Matamma, Gallabat, which specimen Hackel mentions on the following page as ambiguous between *effusus* and *aethiopicus*. The references to *Holcus decolorans* Willd. and *Trachypogon avenaceus* Nees are to plants described from American specimens.

Holcus decolorans Willd.: L. Sp. Pl. Ed. 4. 4:931. 1805. Specimens from "America meridionali," apparently those from which *Andropogon decolorans* H B K. was later described.

Andropogon decolorans H B K. Nov. Gen. 1:190. 1815. Based on specimens collected between Cumana and Bordones, Venezuela. As Willdenow's description of *Holcus decolorans* is cited, that is evidently based on the same collections. The plant is indicated to be perennial.

Sorghum decolorans R. & S. Syst. Veg. 2:838. 1817. New generic reference for the above.

Andropogon avenaceus H B K. Nov. Gen. 1:189. 1815. Described from specimens collected at Havana and Regla, Cuba. The citation by H B K. of the name *Andropogon avenaceus* Schrad. is an error as at the place cited Schrad. describes only *Andropogon arundinaceus* Scop.

Trachypogon avenaceus Nees in Martius Fl. Bras. 2:354. 1829. Different generic reference for *Andropogon avenaceus* H B K.

There is reason to doubt Hackel's reference of *Holcus decolorans* Willd. to *effusus* as all the specimens in the U. S. National Herbarium from Cuba, including some from the vicinity of Havana, are *Andropogon*

halepensis. For the same reason there exists doubt as to the identity of *Andropogon avenaceus* H B K. as that is based on specimens from Venezuela, from which country only specimens of *Andropogon halepensis* exist in the U. S. National Herbarium. *Trachypogon avenaceus* Nees was used with especial reference to specimens from Brazil where *effusus* is abundant, and therefore there is not the same reason to doubt Hackel's disposition of this binomial.

Culms tall, 2-3 meters or more, stout; leaves flat, 2-4 cm. broad, bright green; panicle large, 30-50 cm. long, loose, oblong to ovate or pyramidal, somewhat nodding; branches slender, subverticillate in 5 to 8 whorls, ascending or sometimes spreading, the lower ones half as long as the panicle, pilose at the nodes; lower glume of fertile spikelet elliptic-lanceolate, 6-7 mm. long, 2 to 2.5 mm. wide, 7-nerved, slightly coriaceous, somewhat constricted at base, straw-colored and falling easily when mature, covered with a white or fulvous appressed pubescence or glabrate on the back; awns 7-9 mm. long, but short-awned and awnless forms also occur; sterile spikelets narrowly lanceolate, often purplish, nearly glabrous, strongly nerved, 6-7 mm. long, on shorter hairy pedicels; caryopsis brownish-yellow, obovoid, flattened, 3 mm. long.

This subspecies is apparently restricted in Africa to the humid region surrounding the Gulf of Guinea. In America it occurs in Brazil and Cuba, probably introduced with slaves. The type is Willdenow's original specimen of *Andropogon arundinaceus* which came from Guinea. We have not seen this specimen but follow the conclusion of Hackel who bases upon it his *Andropogon sorghum effusus* subvariety *aristatus*.

The following specimens have been examined:

SPIKELETS WITH LONG AWNS (subvar. *aristatus* Hackel).

S. Thome, *Moller* No. 150, June, 1885 (Kew); Kamerun, Ossidinge, *Dr. Mansfeld* No. 8 (Berlin); Bomma (Boma), Congo River, No. 136, 5-9-74 (Berlin); Spanish Guinea Hinterland, Nkolentangan, Alcu, *G. Tessmann*, No. 257, March 5, 1908 (Berlin); Spanish Guinea Hinterland, Fan, *G. Tessmann*, No. 93, in 1907 (Berlin); Brazil, *Burchell*, No. 1632 (Cambridge); Pernambuco, *Gardner* No. 1177 (Cambridge); Brazil, Sao Joao del Ray, Minas. *Dorsett* No. 309b. under cultivation (Washington); Brazil, Lavras, Minas, *Dorsett* 213b (Washington).

SPIKELETS WITH SHORT AWNS (subvar. *submuticus* Hackel).

Brazil, *Blanchet* No. 1962 (Washington); Brazil, near Rio Janeiro, *Wilkes Exped.* (Washington); Fernando Po, *Mann*, No. 114, Dec. 1859 (Kew); Togo, Misanohe, *Baumann*, No. 151, 5 IV 94 (Berlin); Nupe, Niger Banks, *Barter* No. 170 in 1858 (Berlin); Mav-Tchufi, Kamerun, *C. Ledermann* No. 4180 (1909) (Berlin). Nun mouth of Niger, *Vogel* No. 50 (Kew). The last specimen is peculiar in that the fully mature spikelets are black, and indurated.

SPIKELETS WITHOUT AWNS.

Nupe, Niger Banks, *Barter* No. 1379 (Kew); Gabon, French Kongo, *Soyaux* No. 284, 20 | 4 | 1881 (Kew) (Berlin); Gold Coast, *W. H.*

Johnson No. 799, Abusi, 17 | 9 | 1900 (Kew); Brazil, Bahia, Dorsett No. 38,005 (Washington); Brazil, Gardner Nos. 1177, 1184 (Washington).

The Ledermann specimens from Mav-Tschufi are perhaps distinct. They were collected on the sandy banks of a river and grew to a height of 3 to 4 meters, the stems as coarse as durra. Of the two sheets in the Berlin herbarium one has awns 12 mm. long; the other is awnless but otherwise indistinguishable; lower glumes 9-nerved. The branches of the panicle are shorter than in the plant of the coast. Along with these Ledermann collected under No. 4153 specimens that are perhaps hybrid with cultivated forms. The sheet in the Berlin herbarium contains two erect panicles each about 30 cm. long and 5 cm. broad. One has the spikelets pale, nearly smooth, awnless, 6 mm. long by 2 mm. broad. It much resembles *drummondii*. The other has the spikelets 6 mm. long, 3 mm. broad, densely pilose with purplish hairs, its small awn exerted about 2 mm. In general character it approaches *cordofanus*.

The occurrence of this grass in Brazil is doubtless an incident due to the slave trade. It is of interest that the only two wild forms of *Andropogon sorghum* that reached America accidentally, namely, *drummondii* and *effusus*, are both Guinea coast forms, the very region whence most of the slaves were secured. Furthermore, all the forms of *effusus*, namely, awnless, long-awned and short-awned, occur in Brazil; indeed Hackel knew the last only from that country. Hackel probably on the basis of a herbarium label states that *effusus* is cultivated in Brazil, but Dorsett found it as a spontaneous weed, only rarely cultivated. It is at the present time being tested under cultivation in the Gulf States.

***Andropogon sorghum verticilliflorus* (Steudel) n. comb.**

Andropogon verticilliflorus Steudel Syn. Pl. Glum. 1:393. 1854.

Stems rather slender, probably never exceeding 6-8 mm. in diameter at bases, probably 1 to 2 meters tall; leaf blades flat, pale green 1-3 cm. broad; panicle loose, erect or somewhat nodding, 20 to 50 cm. long, pyramidal; branches subverticillate, in 5 to 10 whorls, slender, ascending or somewhat spreading, the lowest about half as long as the panicle, each naked for about one-third its length; lower glume of fertile spikelet lanceolate or lance-ovate, coriaceous, straw-colored, or at length somewhat reddish, not constricted at base, 5-6 mm. long, 2 mm. wide, 7-nerved, moderately persistent, glabrous on the back, pubescent near the margins with white hairs; awns 12 mm. long; sterile spikelets narrow, strongly nerved, glabrous, as long as the fertile on shorter hairy pedicels.

Steudel's original specimen was from the island of Bourbon. The following are doubtless the same: Mauritius, *M. Bonton*, 1864 and 1865. "Naturalized abundantly in the forests and valleys." Flowers Dec. to May (Kew); Rodriguez, *M. Bonton*, "G73" 1864-5 (Kew); Rodriguez, *Dr. I. B. Balfour*, 1874 (Kew); Bourbon, *Dr. I. B. Balfour*, 1875. Stems at base of specimens 5-6 mm. thick (Kew); Mohilla Island (Comoro Islands), *Dr. J. Kirk*, April, 1861 (Kew); Johanna Island (Comoro

Islands), *J. M. Hildebrandt*, June-Aug., 1875 (Kew. Berlin); Mahe, Seychelles, *G. Neville*, 1887 (Kew).

The Balfour specimens (rather mature) both shed the spikelets like Tunis grass from a well formed scar or cicatrice; the other specimens do not usually form a scar.

Specimens from Madagascar collected by *Rev. R. Baron*, 2385, Dec. 1883 (Kew), 4568, Dec. 1885 (Kew), have the fertile spikelets only 5 mm. long, and are a trifle more pubescent.

A specimen in the Kew herbarium collected by *A. Cunningham* in Australia before 1862 is doubtfully referred here.

Most of the material from southeast and south Africa is very similar to the insular plant, but none of it identical. Four forms may be distinguished, one from German East Africa, a second from about Mount Kilimanjaro, a third from the eastern and southern portion of South Africa, i. e., Natal, Transvaal, the coast of Cape Colony, etc., and a fourth from the drier regions to the westward.

The material from German East Africa differs in having the pubescence on the spikelets longer and looser. Among the specimens examined are: Tunungus, Ger. E. Africa, *Stuhlmann* No. 8692 (Berlin); Werawa, Rukingo, Ger. E. Africa, *Stuhlmann* No. 6091, Feb. 15, 1894 (Berlin); Usambara, Ger. E. Africa, *Dr. J. Buchwald* No. 509, Dec. 28, 1896 (Berlin); Kavirondo, Br. E. Africa, 6th day from Mumias, *A. Whyte*, Dec. 12, 1898 (Kew); Ger. E. Africa, *Busse* No. 140 (Kew); Kwa-Wasiri, Uzeguha, Ger. East Africa, *W. Busse* No. 171 (1900). *Busse* makes the following notes on No. 171: found growing about sorghum fields; natives name "lumbolo." "Diese Pflanze ist im Gabi Sud der cultivierte sorghum sehr ahnlich, nur durftiger als dass; vielleicht die durch aberwilderung wiedergewonnen Urform von *Andropogon sorghum?*"

Specimens from the vicinity of Mt. Kilimanjaro have decidedly larger spikelets, 6-7 mm. long, but otherwise seem indistinguishable. Such specimens are: Kilimanjaro & Meru near Mebula, *Dr. C. Uhlig*, No. 855, Dec. 18, 1901, 1200 m. alt. with leaves 1 to 2.5 cm. broad and spikelets mostly fallen, those remaining 5-7 mm. long (Berlin); Kilimanjaro, Moshi, *Morder?* No. 386, April, 1904 (Berlin), with leaves 3 cm. broad.

The two following specimens have narrow leaves and small, rather narrow panicles, but the spikelets are very similar: Kilimanjaro, 1100-1200 m. alt. *Dr. R. Endlich*, No. 41, Nov. 1908 (Berlin). In "Mischwald und Baumsteppe"; leaves 1.5 cm. broad; Kilimanjaro, Marangu, *G. Volkens* No. 1477. Dec. 8, 1893 (Berlin). In wet places, scattered; leaves, even the basal ones, narrow, 6-10 mm. wide.

The plant of the moister portions of Africa south of latitude 28° differs from typical *verticilliflorus* in having the narrow leaves 1 to 2 cm. broad; a smaller and looser panicle, and usually purple-tinged, slightly larger spikelets, 5-7 mm. long. Here belong the following specimens: without locality, *Drege*, Hb. Nees No. 4240 (Berlin); Natal, Banks of Tugela, *Buchanan*, No. 296 (Kew, Berlin); Bet. Shupango & Senna, *Dr. J. Kirk*, Jan. 1859 (Kew); Kongone mouth of Zambesi, *Dr. J. Kirk*, Jan. 1859 (Kew); Natal, Umlazi River, *Krause* No. 184 (Kew); Natal,

W. T. Gerrard No. 690 (Kew); Natal, Umhlanga, J. M. Wood No. 1332 (Kew); Pondoland, F. Bachmann, No. 207, in 1888 (Berlin); Melville, Burchell, No. 5465, June 8, 1814 (Kew). Two specimens at Kew are labelled "Tabucki grass from the Cape," one "ex herb. Rotterianum" probably collected by Thunberg; the other "ex herb. Wight" perhaps grown in India. This is apparently the grass to which the nomen nudum *Andropogon tumbacianus* Roxburgh Fl. Indica 1:276, 1820, was meant to apply.

In the drier interior and western parts of South Africa the panicle is decidedly more purplish, even the hairs on the spikelets and pedicels being reddish. These differences are perhaps wholly due to climatic influence. Among such specimens are the following: Orange River near Verleptam, Little Namaqualand, Drege (Kew); Grootfontein Nord, Ger. S. W. Africa, Morgenstern (Berlin); St. Clair, near Douglas, Herbert, MacOwen No. 185, Oct. 1897 (Kew) and No. 1995, 1897 (Kew, Berlin); Salisbury, Rhodesia, E. R. Townsend Feb. 1909 (Kew); Kymbila (?) A. Stolz No. 1203, Apr. 11, 1912 (Berlin).

This subspecies has been grown in the greenhouse from seed supplied by Mr. I. B. Pole-Evans, Pretoria, Union of South Africa, from which the following notes were taken: stems slender; nodes of culm 7 to 9; leaf-blades 45-60 cm. long, 2-3 cm. wide; mature caryopsis brownish-yellow, ellipsoid, compressed, 3 mm. long.

***Andropogon sorghum abyssinicus* n. subsp.**

Culms stout, 6 mm. thick at base of the panicle; upper leaf pale, flat, 4-5 cm. broad; panicle (young) 30 cm. long, very loose; branches slender, flexuous, ascending-spreading, strongly pilose at the nodes, the longest half the length of the panicle; lower glume of fertile spikelet elliptic-lanceolate, 6-7 mm. long, 2.5 mm. broad, 9-nerved, subcoriaceous, nerved only near the apex, quickly deciduous, constricted above the callus, covered with short white pubescence or at length glabrous on the back; awns about 20-25 mm. long; sterile spikelets narrowly lanceolate, strongly nerved, 6-7 mm. long on shorter hairy pedicels; immature spikelets pale straw-colored.

Collected at Matamma, Gallabat, Abyssinia by Schweinfurth No. 1521, July 25, 1865, who notes that it is "sehr haufiger Rohrgras bei Matamma" and a "mussenhaftes Unkraut in der Gärten." Type at Berlin; duplicate at Kew.

Hackel cites this as the first specimen under *effusus* (subvar. *aristatus*) but under *aethiopicus* he refers to it as intermediate between *effusus* and *aethiopicus*.

From Schweinfurth's notes it would seem uncertain whether the plant is wild or simply a weedy form of a cultivated plant.

***Andropogon sorghum cordofanus* (Hochst.) n. comb.**

Andropogon cordofanus Hochst. Flora 27:245. 1844. Type collected in Kordofan by Kotschy (Flora aethiopica No. 54).

Andropogon aethiopicus Rupr.; Steud. Syn. Pl. Glum. 1:372. 1854. Described by Steudel from the MSS. name of Ruprecht, based on the same collection as the preceding.

Andropogon sorghum aethiopicus Hack. in DC. Monogr. Phan. 6:504. 1889. Also based on the collection of Kotschy from Mt. Arasch-Cool, Kordofan, the previous descriptions having apparently been overlooked. Hackel describes two subvarieties, namely, *longearistatus* with awns 24-32 mm. long, and *breviaristatus* with awns 5-15 mm. long, both represented in Kotschy's collections.

Culms rather stout, glaucous, 10 to 12 mm. in diameter near the inflorescence and probably much stouter at base; nodes appressed pubescent; leaves pale green and somewhat glaucous, the blades flat, rather short, 10 to 25 cm. long, 10 to 25 mm. broad, glabrous at the collar; panicle ovate to oblong, 10 to 30 cm. long, erect, rather dense, the branches ascending or a little spreading, the longest only one-third the length of the panicle; lower glume of fertile spikelet 6.5 to 8 mm. long, 3 mm. broad, pale at first at length reddish, densely covered with short silvery appressed pubescence, but at maturity more or less glabrate on the back, obscurely 9-11 nerved, the nerves evident only near the apex; awns short 5-15 mm. (subvariety *breviaristatus* Hackel) or long 20 to 30 mm. (subvariety *longearistatus* Hackel); sterile spikelets lanceolate, sparsely pubescent, strongly 9-nerved, 7 mm. long, the very hairy pedicels only a little shorter; stamens well developed; mature caryopsis not seen.

Kordofan, Mt. Arasch-Cool, *Kotschy* No. 158, Oct. 10, 1839 (Berlin, Washington). This is the type of Hackel's subvariety *breviaristatus* and almost certainly the same as *A. cordofanus* Hochst.

All of the remaining specimens belong to subvariety *longearistatus*: Kordofan, Mt. Arasch-Cool, *Kotschy* No. 390, Oct., 1839 (type) (a specimen of *virgatus* on this sheet in Kew Herbarium) (Cambridge); Aethiopia, *Kotschy* No. 132 (Kew); Blue Nile, *C. L. Muriel*, Aug. 11, 1900. Tall reedy grass 10 ft. high. Arab. "Arda." (Kew); Wadi Ercmit, between Suakin and Berber, *Schweinfurth* No. 655, Oct. 5, 1868 (Berlin); Omdurman, *Dr. R. Hartmann*, June, 1860—Abnormal smutted specimen (Berlin).

The two specimens collected by Hartmann are both abnormal, being infested with smut. They were referred to by Schweinfurth (*Plantae Quaedam Niloticæ*, p. 43, 1862) who considered them referable to *Sorghum crupina* Link.

This subspecies in its typical form seems confined to upper Egypt in the region surrounding Khartum. It seems much subject to infection by a smut (*Sphacelotheca sorghi*) which produces an abnormal inflorescence.

Specimens collected in Sudan by *H. M. & A. F. Brown* No. 1473 (Kew) are very close to typical *cordofanus*, differing mainly in the shorter awn and the lateral spikelets. Under cultivation in the greenhouse this produces 17-jointed stout culms 2-3 meters high; leaf-blades 50 to 100 cm. long, 3-5 cm. broad; panicle oblong-ovate, rather close, 20-30 cm. long, with ascending branches; spikelets readily deciduous at maturity; fertile

7 mm. long; awn 13 mm. long; sterile very narrowly lanceolate, and without trace of stamens.

Hackel refers to *aethiopicus*, a specimen collected in Darfur by *Dr. Pfund*. This specimen is a panicle only with broadly lanceolate spikelets hairy only near the margin, shiny on the back and at maturity black. Awns 12 to 15 mm. long. It seems impossible to include it in *cordofanus*, but it is more nearly allied there than to other forms. It may be a cultivated plant or a hybrid with such.

Still more doubtful is a specimen from Damaraland collected by *Marloth* near the hot springs called Barmen. This plant has the same pale herbage as *cordofanus*, but the leaves are narrower and longer and the culms apparently more slender. The spikelets are narrower than those of *cordofanus*, dark purple covered with a purplish pubescence, except a small area on the back. Awns 16 mm. long. Additional material will probably show this to be distinct.

***Andropogon sorghum hewisoni* n. subsp.**

Culms stout, several to many from the same roots, erect, 1-3 cm. in diameter, 3-3.5 meters tall, somewhat waxy coated; nodes 13 to 19; leaf blades 70-100 cm. long, flat, 4 to 8 cm. broad, the sheaths mostly longer than the internodes; panicle barely exerted from the uppermost sheath, very compact, somewhat fusiform, thickest in the middle, 10-15 cm. long, 3-4 cm. thick, the longest branches about one-third as long as the panicle; spikelets moderately persistent; lower glume of fertile spikelet broadly ovate or oval, 5.5 mm. long, 3 mm. broad, 9-11-nerved, densely covered with white hairs, green except the chestnut-red base; awns 11 mm. long, smooth to the elbow, scabrous above; lateral spikelets narrowly lanceolate, hairy, without stamens; caryopsis brownish-yellow, obovoid, compressed, 3.5 mm. long.

Grown in the greenhouse from seed collected by *R. Hewison, Esq.*, in Sennaar Province, Sudan, "obtained from wild plants."

At Arlington Farm, Virginia, the plants grew to a height of 2 to 2½ meters but did not bloom by the time of killing frosts. It is therefore decidedly a long season plant.

This subspecies strongly suggests *cordofanus* but the heads are much more dense, the awns smaller and the lateral spikelets without stamens. It is even more closely allied to the specimen collected by Brown in Sudan referred to under *cordofanus* but that has loose panicles, and spikelets that drop very readily. The dense heads suggest the possibility of its being a cross with a cultivated variety of durra, but it does not seem that this is probable.

Hewisoni may be the wild original of the durras as the pubescence in the spikelets suggests. This origin would be consistent with the restriction of the true durras in Africa to Egypt and Sudan and with their absence from other parts of that continent.

***Andropogon sorghum niloticus* Stapf in herb. n. subsp.**

Culms tall, stout, 4 mm. thick at base of panicle; leaf blades flat, the

upper 2 cm. broad; panicle narrowly oblong, erect or a little nodding near the top, 15 to 40 cm. long; branches slender, ascending, the longest about half the length of the panicle, all naked toward the base; lower glume of fertile spikelet coriaceous, ovate, very convex, constricted at base, nerved near the tip, smooth and shiny on the back, hairy at base and on the margins, straw-colored but apparently becoming reddish at maturity, 4-5 mm. long, $\frac{2}{7}$ -2.5 mm. broad, faintly 7-nerved; awns 10-12 mm. long, or in one panicle wanting; sterile spikelets very narrow, longer than their hairy pedicels. The sterile spikelets drop early but the fertile are persistent, apparently as much so as in cultivated forms.

Banks of White Nile a little south of Gaba Shambe, intermingling with other grasses but much taller, *Consul Petherick*, June 25, 1862 (Kew).

This subspecies is clearly allied to *cordofanus*, but differs in its larger looser panicles and smaller spikelets.

What may be the same subspecies has been collected on Ruwenzori by *G. F. Scott Elliott* No. 7612 (Kew). The specimen is slender about 60 cm. high, with leaves 1 cm. broad, and a somewhat secund panicle 16 cm. long. The spikelets are orange-red but very similar in form to the Petherick specimen.

***Andropogon sorghum drummondii* (Nees) Hackel.**

Andropogon drummondii Nees; Stendel Syn. Pl. Glum. 1:393. 1854.

Andropogon sorghum drummondii Hackel in DC. Monogr. Phan. 6:507. 1889.

Culms about 2 meters tall, commonly solitary or but few from the same root, stout, often 1 cm. or more in diameter; leaf blades pale, flat, the upper 2 to 4 cm. broad, 40 to 50 cm. long; panicle pyramidal-oblong, erect, commonly 30-40 cm. long, rather dense; branches ascending, the lower about one-fourth the length of the panicle, naked at base; lower glume of fertile spikelet elliptic to ovate-elliptic, very coriaceous, nerved for the upper third, distinctly constricted at base, 5-6 mm. long, 2-2.5 mm. broad, 11-nerved, glabrous on the back, sparsely pubescent near the margins, persistent, straw-colored but often becoming reddish at maturity; sterile spikelets narrow, about 3 mm. long on hairy pedicels of about the same length; grain oval, flattened, 4 mm. long, orange-colored.

This subspecies was originally described from specimens collected by *Drummond* at New Orleans in 1832. Those preserved at Kew are very young small plants with the panicle just emerging. In Louisiana and Mississippi this plant has long been known as "chicken-corn," it appearing spontaneously each year in cultivated ground. In recent years it has become scarce due probably to the work of the sorghum midge. Chicken corn is very similar to cultivated varieties of sorghum. The stems contain no sugar. The constriction at the base of the fertile spikelet is a very constant character, but occurs in some other wild sorghums.

Chicken-corn was undoubtedly brought to America by negro slaves, perhaps accidentally. African specimens have been examined as follows:

Sokoto, Northern Nigeria, *Dr. J. M. Dalziel* No. 518, the native name "Kerama" (Kew); Senegal, *Roger* in 1823 (Kew).

Specimens collected at Kouroussa, French Guinea, *M. Pobequin* No. 539, Dec., 1900 (Kew) are very similar, but the panicle is secund drooping and the spikelets black at maturity. It is perhaps a cultivated variety as it is labelled "Mil sauvage."

Hackel mentions typical specimens from Nupe on the Niger, collected by *Barter*. He also cites cultivated specimens from Dahomey, Mexico and Carolina. There are specimens in the U. S. National Herbarium from Yucatan and Guatemala.

The plant is apparently confined to the general region of the Niger, and perhaps is not a really feral form, but one modified by cultivation. At any rate, it is more closely similar to some cultivated varieties than any undoubted wild form as yet known.